Notebook Series -- Notebooks by Edison
Notebook, N-18-09-01

This notebook was used by Edison in September 1918. The entries pertain to the construction of powder blanks for disc records. Included are notes on two standard mixtures for making blanks and three schedules for baking them. The blanks consist of rosin, chalk, and flock in differing proportions, and the schedules involve gradual heating of the blanks before varnishing and printing. There are notes on the viscosity of rosin at various temperatures, the quality of blanks obtained, and the methods of mixing and forming blanks. One entry has a table of "Properties of alloys of Rosin & Resinate of Manganese." Another includes notes on testing various fillers for iron. The notes indicate that William W. Dinwiddie and Charles T. Dally assisted Edison with the experiments. The front cover is labeled "Edison A" and "The August 1918 Record." The pages are unnumbered. Approximately 25 pages have been used.

Mixing Formula - No 1 Sept 1 1918

Proportions

120 grams. Rosin [I] grade
300 " Chalk
28.8 " Short Flock

Weigh out chalk in three parts

Add all the flock, all the melted rosin & put in 1st part of the chalk mix till tenacious dough, then add 2nd portion of chalk, mix till tenacious dough, finally add last portion of chalk & mix too tenacious dough -

Keep mixer hot using 15 to 20 lbs steam and mixer lagged to prevent radiation & loss of heat,

If higher melting point Resins

are used, increase steam pressures

Properties of alloys of Rosin & Resinate of Manganese

Proportions	grms	Color at which piece first makes an impression by using a little pressure	Temp at which Thermometer just touches surface of oven when weight	Temp where mix is like Tar or heavy Varnish	Soft as Butter	Mix flows + rises to Top of liquid
Straight Rosin		126	135	167	194	212
100 Rosin	10 Mn Res	140	158	180	205	212
100 "	20 "	154	167	198	212	—
100	30	163	172	207	—	—
100	40	169	180	216	225	230
100	50	180	194	221	230	235
100	75	192	207	230	239	243
100	100	198	219	248	259	262
100	100 x	203	219	248	261	266.

boiled more

The small mixer holds

2700 Chalk
1080 Rosin
259 Flock.

Schedule # 1
Standard Sept 6 –

The Chalk being divided in 3 sections.

We heat the Blank Gobs in oven 1 hour & 30 min To 281° Fahr & then press To blank, press moulds being 135° Fahr

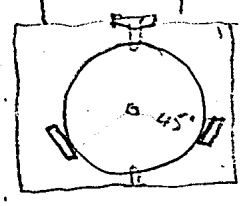
We baked varnished blanks on following schedule.

30 min 110 Fahr
30 " 120 "
40 " 140
1 Hour to 150
Held 5 hours at 150° Fahr

These blanks badly warped + although pressed for 8 hrs at 225 lbs steam + 125 lbs hydraulic

It wears.

I then made a change in the holding rack for baking the blanks



and baked on the following

Bake schedule

Schedule #1

30 Min to 110 Fahr
40 " 120 "
1 Hour to 130
1 " " 140
Hold 7 hours at 140.

Came out all straight

I notice on some a few raise ups 1/4" diameter + less,

Printed. Used Thermoweld.
2 Min Contact at 220 Fahr
12 " 100 lbs hydraulic pressure at 220 deg. Squeezed out thin sheet about 1½" wide — Record nearly perfect but not quite filled in few small spots.

Diamond run 20 times no Cutting — not scratch by finger nail —

Record also dropped on Desk platter 53 times 1 ft high before breaking -

Record had 2 places where dedit fill - probably bad blank - Baked blank on #1 Schedule -

Blank baked by #1 Schedule

Pressed by this Schedule

Contact 2 min at 150
High pressure 750 lbs at 150 for 4 min
Dropped pressure to 75 lbs &
put heat at 230° for 10 mins
its hard & OK but cracked
one half - probably should
have Contact for 4 min

We present another by this Schedule Except

4 mins Contact instead of 2 minutes.

Thus No One schedule

Use flattened blanks

Bring to Contact + hold 4 minutes when temperature has reached 160° by thermometer on platten.

Then keeping Temp still 160° Raise pressure to 750 lbs Hydraulic hold for 4 minutes,

Then reduce pressure to 75 lbs Hydraulic + Raise temp to 230° + hold for 10 min — then Chill —

Manganese Peroxide Experiment
Mix for small Machine
Chalk 2700 grains —
Flock 259 "
Rosin - 724 + ManganeRes 356
Total Rosin 1080,

Requires very much more heat in mixer. Couldn't mix with this machine & had to mix in Pint machine which it did ok — but got 4" not good — not Enough to make a blank.
We have now bagged

the 4000 gram Machine &
Can probably mix it OK.

We divide the chalk in 3
parts. All flock & Resin
+ 1/3 of Resin put in —
flock 1st then Resin, then
Chalk —
After tenacious got add
2nd part of chalk when
this tenacious add final
3rd & mix till OK +
tenacious —

No 4 Record printed by No 1
Schedule, — One side is Al-
only 1 snap other side 6 snaps 74
Either punch outs or bad blank
Vocuvision — general surface
fair to Edison good to Dina Really

Sept 10th —

Bake Schedule No 2

1	hour	to reach	110
1	"	"	120
1	"	"	125
1 1/2	"	"	130
2	"	"	140

Hold at 140 for 8 hours

No 1 Schedule worked OK

This is to prevent small bubbles & to help process schedule out reducing the time of hardening & long wears in oven

~~Nat~~

I note that the record prints made with No 1 Print Schedule, No 1 Bake Schedule - & para 8 6/4 Var are OK for smooth scratch etc or only defections by a few snaps due 1st to blank 010 pull out and bad varnish glowing holes so deep no amount of flock of blank will fill them —

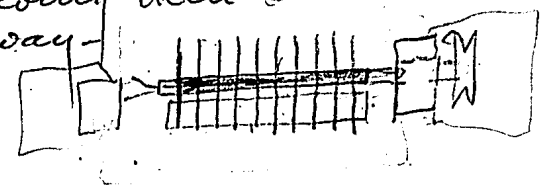
The ring in mould to reduce amount flowed out in printing is OK & helps to make a good fill —

What we need is a little more flock to make surface of blank stronger so varnish will not be torn off in spots when there is a slight tendency to stick to mould —

8 @ 10% flock probably OK —

We find that with 10" disc at high speed on our Emery wheel, the disk 40/1000 that slots are cut nicely with smooth walls into Cold globs. 1" in 10 sec with bigger belt can cut at 3 or 4 times this speed — also that when glob is hot it goes much faster.

Could squirt out a 4" long cylinder say 20" long — afterwards put in oven + heat + then cut in say 15 globs simultaneously while hot preventing unoxidized faces. the 2 extreme ends having then slice cut away —



Sept 12 1918

We now have baked 13 Varnished blanks & 6 unvarnish blanks by No 2 Schedule —

There are a few 1/4 blisters but the small bubbles are greatly diminished and all will print OK. These small bubbles average 010 circumference

Its hard to say what causes them We have 6 unvarnished blanks & we will Vary time & bake No 2 Schedule & if there 010 bubbles are still there this will prove its not the blank but due to Varnish

Among the varnished blanks in this lot is some with 6% flock & also 7% 8% & 9% flock — The amount of bubbles are about the same — but 6% which is the one we been using Reg bends slightly in holder but OK — It looks as if 7% flock is best.

Baked 15 of various kinds by
No 2 schedule.
They came out all OK
yet a little warped but
not very noticeable to type.
They are straight enough
for practice 8/0 flock
OK —
Daley varnished a block,
pressed in a smooth metal
till polished like a
record — They came
out fine — No bubbles
but numerous specks
stick up — possibly dust
point only 002 in size

Effects are felt in making
think vacuum were hard
no bubbles —

The Blanks that were
baked in process new
often vacuumed + baked
again had just as many
bubbles showing that
it is poor surface of
blank + lack of ice
that causes air to be
trapped by vacuum that
produced the bubbles
Everything shows that

a blank perfectly filled
there will be no bubbles
or if baked in oven
then a varnish will
ground there will be
no pocks or bubbles

126= Sept 16 1915
No 1 standard -
Standard mix for blank

Rosin	27%
Cotton (short)	8
Chalk -	65 -

This varnish bakes ok on
No 2 bake schedule - & fills
on blank pieces.

Shedule #1 for 126 standard mix

Blank press on 126 mix

Circulating water in press is kept at 47° Cent,

Pressure 925 lbs

Oven temp. 145° C

Gobs in 1½ hours.

We find standard mix #1 of Sept 16 has too much flock so it dont flow & fill as well as the old mix — It stands more than 10 drops 2 ft high & hence has enough amount of flock, 12% flock stands 10 drops 4 ft high

We now return to #old 70

Sept 18 1918

2 standard mix now to be used -

120 Rosin
24% flock
300. Chalk

This is

960	Rosin	26.6 %
230	flock	6.5
2400	Chalk	66.9

It would seem that more there is of flock the worse the fill & worse open surfaces

12% flock made 10 drops at 4 ft + 1 crack from Center to Edge in one place

This strength is entirely unnecessary-

Bake Schedule ~~set~~ No 3. for soft blanks using 5 Para -

1 Hour to reach		110
1 "	"	120
1 "	"	125
1 "	"	130

Hold at 130 for 8 Hours -

Tested fillers for iron

Magnesia Silicate, Very little, NCP
decomposes at some what giving free Silica

China Clay very little iron

Lion Clay no iron - OK

Rotten Stone careful iron $\frac{1}{3}$ no iron

Chalk not much iron might
say very little,